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Gas Journal

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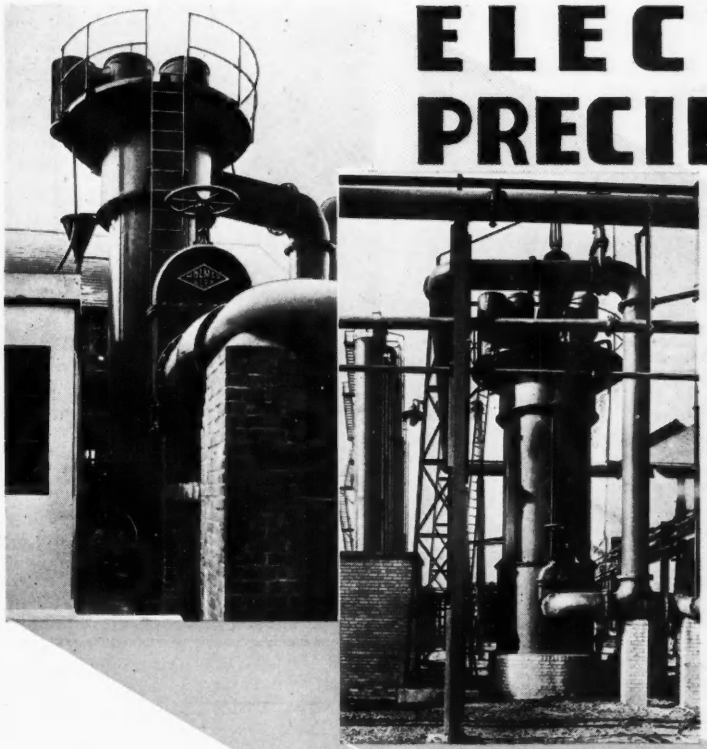

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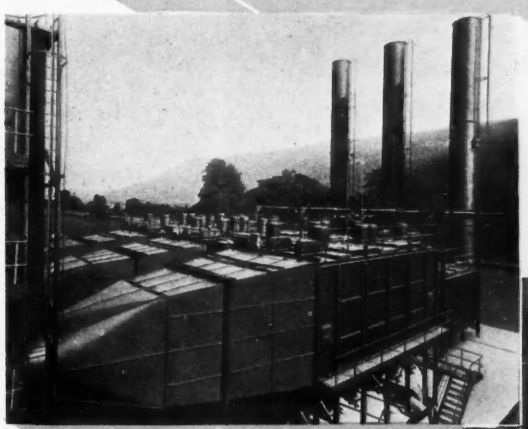

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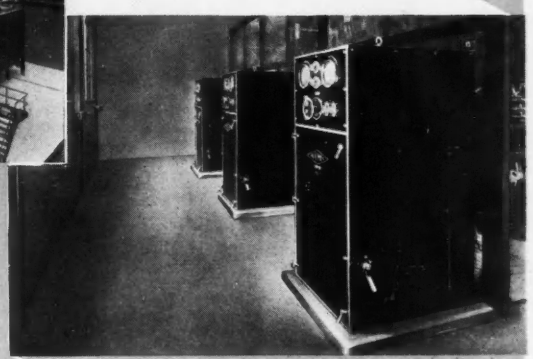

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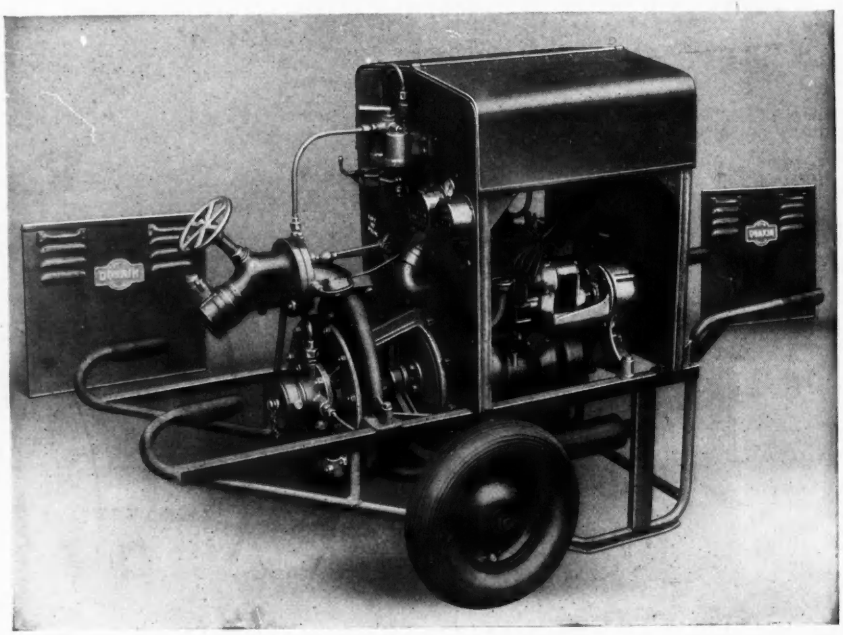

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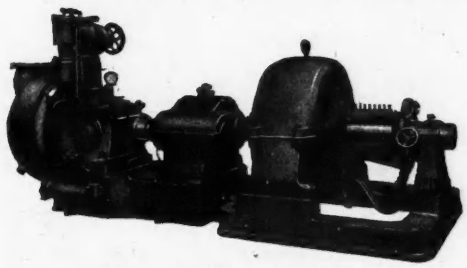

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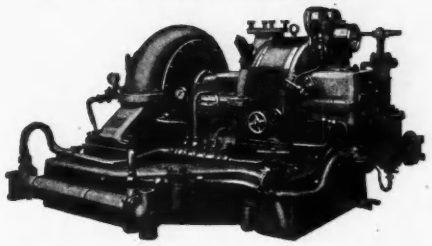

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Date of Meter 1867
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GAS JOURNAL, OCT. 29, 1941

VOL. 236 93rd YEAR No. 4093

EDITORIAL NOTES

FUEL ECONOMY AND CALORIFIC VALUE

IN recent weeks we have discussed at some length and from many angles the subject of declared calorific value in its relation to wartime conditions, and in our last issue we gave a very definite warning in regard to the likelihood of rationing of all forms of fuel used for domestic purposes unless voluntary action by individual consumers does in itself effect the considerable reduction in consumption which national interests demand. We emphasized the very real need for every gas undertaking in the country to do all in its power to urge consumers to use less gas and thereby not only avoid the irritations, complexities, and expense of compulsory rationing, but also make available for essential war purposes additional quantities of coal. Gas is a domestic necessity. Apart from any other appliances, there are over 8,000,000 gas cookers in the homes of this country, and a supply of gas to these homes in wartime in particular is essential for the maintenance of health and morale. At the same time, the Government needs all the fuel it can get for the production of munitions, and places this as first consideration; and we defined its attitude in the "JOURNAL" unmistakably last week—that a definite saving of coal by our Industry has been demanded in the national interest. The crux of the entire problem is coal.

The Gas Industry can do a great deal with coal in the matter of its conversion into other products—gas, coke, and tar. It can at will increase the quantity of gas made at the expense of the amount of coke produced. It can, in fact, in large measure convert the whole of the coal into gas by carbonization and water gas production either by steaming in a continuous process or in separate water gas generators. In peacetime it was necessary to strike an economic balance, and adjust and adopt conditions which would ensure the manufacture of that quality of gas which could be sold to the consumer at the lowest price—not sold theoretically but actually delivered at the consumer's burner. In wartime, expediency over-rules economic considerations; it is not a question of the cost of gas but of its availability. The greater the thermal output of gas from a ton of coal, the greater its volume and the lower its calorific value; but provided the consumer gets the necessary heat required—we are thinking of the domestic consumer—he has no need to be concerned with calorific value. Drastic alteration in calorific value would entail a good deal of adjustment of appliances, but, granted this adjustment, one B.Th.U. is, within reasonable limits, as good as another for the simpler domestic gas-using apparatus. But, as we have said, the heat must be delivered at the burner, and this involves the carrying capacity of the distribution system. The capacity of the mains imposes a limit on calorific reduction; and at the present time the capacity of the mains has an extremely important bearing on the supply of gas for industrial war purposes. It is then not so very easy in practice, though it is simple enough on paper, to make and supply a great deal more gas from every ton of coal supplied to the gas-works.

We have pointed out on several occasions that the Government demands a maximum production of gas, of benzole, of coke, and of tar from the coal treated by the Gas Industry. These demands can only be met by greater supplies of coal to gas-works; otherwise the various demands are incompatible—one must be satisfied at the expense of the other. We require, therefore, a clearer lead on the relativity of these demands, though we suggest, in the absence of a clearer and more precise statement from those in authority, that of the four demands, gas supply may be considered as occupying first place, and, as we have said, we must use less coal from which to make this gas. It would seem, then, that gas of lower calorific value may well have to be supplied. In a letter on the conversion of coal into gas published in the "JOURNAL" recently a correspondent (whose pen-name "J. J. C. B. B." concealed the identity of a carbonizer of credit and renown) put forward this proposition regarding declared calorific value: London and S.E., 475 B.Th.U. per cu.ft. for benzole recoverers, 500 for the rest; Provinces, 425 and 450; Scotland, 400 and 425. He argued that, if this suggestion was adopted and the idea put into practice, we could save something like 1,500,000 tons of coal without noticeable inconvenience to the public. We would mention, though, that this saving does not allow for the lower production of coke which would automatically follow. There would, in fact, be a gap in solid-fuel therm supply which presumably would have to be filled somehow. The yield of benzole and suitable tar would also be lowered. Even so, all things considered, we think that the recent tendency to lower calorific values will become more evident in the near future.

We have to exhort our consumers—our domestic consumers—to use less gas. Salesmen have to "sell" the "buy less" idea, which, of course, is somewhat of a *volte face*. But we must conserve coal on account of short supplies. In this "buy less" campaign, at present a voluntary one, we can do much to educate the consumer in the economical use of gas, provided, of course, the consumer will co-operate and follow advice. Regarding this there are sceptics who, pointing out that small consumers, for the most part prepayment consumers, are the "backbone" of the Gas Industry and are the very people whose pockets have in general become fuller through payment for war work, suggest that it will be difficult to encourage this voluntary economy in gas consumption. In a letter in our columns last week a correspondent expressed the opinion that the turnabout from "Every therm of gas produced helps to win the war" to "Use less gas" would be liable to cause confusion and even distrust in the minds of consumers and the new effort will not in itself produce the desired results. The point is, however, that these results will have to be achieved; otherwise we shall see in operation the costly and cumbersome compulsory rationing scheme which hangs like a dense and low cloud in the sky. Our correspondent then argued, very briefly, thus: The system of block tariffs was introduced to encourage the consumption of gas. In other words, the more gas used, the lower the all-in price per heat unit employed. Why not reverse the idea? Have block rates, not stepped-down, but stepped-up very steeply. For example, after a small first block, step-up the charge for gas consumed by 100% or more, with a further rapid step-up to 200%. That, he suggested, would be likely to work the oracle.

The fundamental point is that economy in domestic gas consumption must be realized, either voluntarily with encouragement and advice, or by compulsion, in order to conserve coal. We have suggested that, broadly speaking, one B.Th.U. in gaseous form is as good as another for most domestic purposes; it is probably as good as another, again broadly speaking, for many industrial processes. We think that if we toured a large number of homes in this country and took careful note of the way in which gas was used, we should find many instances of totally unnecessary wastage due to lack of thought and carelessness. This can be reduced. As a minor point, if gas is left burning needlessly, even for a few minutes only each day, obviously the lower the calorific value of the gas (assuming that the nipple has not been reamered or otherwise altered) the less heat will be wasted in a given time. There are, however,

major points in any gas rationing scheme which should have immediate and determined consideration. Granted the distribution system can cope with the volume of gas, which is inversely proportional to calorific value, then the more therms produced as gas from coal the lower the labour requirements for coal and coke handling—an item of no mean importance in wartime. Then, comparing gas consumption and consumption of coal or coke, small deliveries of the solid fuels call for labour, transport, and petrol which in times of stress such as the present should be reduced to an absolute minimum. Logically one cannot allot rations of gas, coal, coke, and electricity on a thermal basis derived from pre-war usage of these fuels. When labour and transport costs and difficulties are taken into consideration, a B.Th.U. in gaseous or electric form is a very different proposition from a B.Th.U. in solid form.

We have so far referred specifically to domestic use of gas in order to lower the quantity of coal dealt with by gas undertakings, but we feel we must not end this note without reference to possible economies in industrial consumption while maintaining full output of war equipment. There must be many instances of hastily installed industrial gas furnaces and the like which are not by any means operating at the best efficiency, and which could be vastly improved by skilled inspection and attention. Every day that passes which sees industrial gas wastage of the type in mind is a day too many. Economy in domestic gas consumption should be accompanied by the strictest attention to efficiency in industrial gas usage, whatever the calorific value of the gas supplied.

FUEL AND THE FUTURE

LAST week Sir David Milne-Watson was installed as President of the Fuel Luncheon Club, and he took as the subject of his Presidential Address, which we are able to publish in our issue to-day, "Fuel and the Future." He made it quite clear, it should be noted, that he was expressing his own personal views as distinct from the considered opinion of the Gas Industry; but these views will be studied with the importance which Sir David's association with our Industry warrants, and we feel that they will meet with a very large measure of agreement from those not only within but outside the confines of the Industry—in other words, the fuel industries generally. Certainly the Fuel Luncheon Club, representative of such a number of different interests, provided an admirable platform for his remarks.

Welcoming the appointment of Dr. E. W. Smith as Director General of Gas Supply, Sir David maintained that if measures are not taken to prevent it, the various fuel industries will at the end of the war revert, if not to the state of affairs which prevailed before the war, at least to something like it. Therefore the first essentials would appear to be that production, distribution, and utilization of all fuels (including electricity, of course) should be regarded as a single problem. Steps actually are being taken towards unification. Recent changes referred to in the "JOURNAL" mean that now coal, gas, electricity, and oil are—to use Sir David's phrase—"under the same Government umbrella," though he added that the degree of cover afforded differs in each case. The ultimate aim must be a comprehensive Fuel Scheme, each fuel being used in the sphere best fitted for it, with the interests of the public as the basic consideration.

In this regard and towards this end Sir David advocated that the problem should become the sole responsibility of a Minister of the Crown, and in the national interest a Ministry of Fuel should be formed as soon as circumstances permit. We have no need here to reiterate the arguments he adduced in favour of this plan; they are logical. We simply cannot afford a return to the wasteful and in many ways reckless competition of the past, with the community footing the bill. We shall be compelled to conserve our greatest natural asset, coal, carefully; and workable means to achieve this object efficiently and in concert with other Ministries will have to be put into operation. By his Address Sir David has rendered yet another service to the fuel industries.

Personal

Mr. GEORGE COSTELOW, Chief Staff Foreman of the Wandsworth & District Gas Company, has retired after over 41 years' continuous service in their employment. Following his retirement in September Mr. Costelow has been the recipient of several gifts. One of the first he received was an easy chair from his colleagues, which on their behalf was presented by Colonel C. M. Croft, D.L., Chief Engineer and General Manager. Then on Oct. 7 he received a silver salver, together with a cheque, at the hands of the Chairman of the Company, Mr. Frank H. Jones. On the same day Colonel Croft presented him with a shotgun subscribed to by over 300 of Mr. Costelow's colleagues. On each occasion tribute was paid to his excellent services to the Company.

* * *

In addition to his present duties as Engineer and Secretary to the Runcorn & District Gas Company, Mr. J. H. RICHMOND has been appointed to the position of Engineer, Manager, and Secretary of the Northwich Gas Company.

* * *

Mr. J. CASTLE, B.Sc., of Brighouse Gas Department, has been appointed Assistant Engineer and Manager to the Northwich Gas Company.

* * *

Mr. S. MASON, Carbonizing Foreman, a member of the Staff of the Cambridge University and Town Gas Light Company, has been appointed Works Manager to the Crediton Gas Company.

275 Years' Service

The final meeting of the Stockport Gas Committee for the municipal year was held on Oct. 15, when Alderman J. T. Lord, J.P., the Chairman, presided.

During the course of the meeting the Chairman presented long service certificates to nine employees who had retired on superannuation during the course of the year. The service of the employees concerned was: John Brundrett 43 years, James Wild 39 years, Thomas Jackson 39 years, Ronald J. Evans 36 years, Herbert Jepson 34 years, John H. Barlow 23 years, William Hewson 23 years, William Vaudrey 20 years, and William Yeoman 18 years. Alderman Lord expressed the thanks and appreciation of the Committee to the employees for their long and faithful service and wished them many happy years of retirement.

The Committee expressed their thanks to Alderman Lord, Chairman, and to Councillor T. A. Hollinshead for their services during the year, and in acknowledging the vote of thanks the Chairman thanked the Members of Committee, the Engineer, the Secretary, and the staff for their co-operation during the year, which in spite of difficulties had proved highly satisfactory.

British Standard for Screwing Taps

The British Standards Institution is about to issue an important British Standard relating to the dimensions, limits, and tolerances for screwing taps. This standard provides for the general overall dimensions and thread limits of taps used for the production of the most commonly used threads—viz., B.S. Whitworth, B.S. Fine, B.A., and B.S. Pipe (parallel) threads when used for general engineering purposes.

Provision is made for hand taps and Pearn tapper taps of four grades of accuracy—namely, two grades of ground threads and two grades of cut threads. For nut taps two grades of accuracy only are provided, for ground threads and cut threads.

In determining the tolerances and limits on the threads due regard has been given to selecting the tolerances and locating the limits so as to provide for taps in these various grades, which will in general produce tapped holes within the limits laid down in the corresponding British standards for the screw threads themselves.

Copies of this specification, B.S. 949, cloth bound and thumb indexed, may be obtained from the British Standards Institution, 28, Victoria Street, S.W. 1, price 11s. each, post free.

Lessons in Arc Welding

The accumulated welding instruction information from the Lincoln Welding Schools which have been in continuous operation for 24 years is made available to industry and to engineering colleges and instructional centres in *Lessons in Arc Welding*, a new 176-page book published by the Lincoln Electric Company, Ltd., Welwyn Garden City (3s. 6d.). The book comprises a series of 60 lessons which present in concise form the fundamental facts of welding, knowledge of which will enable the welder to utilize the process successfully and economically, and it is of particular value at the present time to any industrial organization faced with the necessity of training its own welders to meet the demands imposed by the increased use of welding. Text explanations are supplemented by line drawings and photographs for ready understanding, and there are 25 pages of questions and answers, enabling the student to check the knowledge he has acquired from each of the lessons. Knowing the subject matter, the student can refer to the index, find the lesson in which it is covered, and then turn to the questions on that particular lesson in the back of the book. Copies may be obtained direct from the Company's headquarters at Welwyn Garden City, or can be ordered through any bookseller.

FUEL AND THE FUTURE*

By SIR DAVID MILNE-WATSON, Bart., D.L., LL.D.

I VERY much appreciate the honour you have done me in electing me your President for the coming year. I shall endeavour to carry out my duties as faithfully as possible. I am particularly interested, as the Fuel Luncheon Club provides a meeting place for a large number of different interests.

I would like to preface my remarks by saying that I am only expressing my own personal views and not the considered opinion of the Industry in which I am most interested.

The subject which I have chosen—namely, Fuel and the Future—is one which cannot readily be compressed into a speech of a reasonable length. Nor can I claim to possess the gifts of a seer able to foretell what the future holds for us and those who come after us ; but looking to the future we can learn from the past and consider in outline at least how past errors may be rectified.

If I speak for the most part regarding coal and those other fuels which are produced by the use of coal, it must not be assumed that I am at all unmindful of the importance of oil. There can be no doubt that oil will make, as it has made in the past, a useful contribution to the solution of our fuel problems. There may be great developments in hydrogenation processes, rendering us less dependent upon imports, and in any case provision must be made to fit oil into the framework of a comprehensive fuel policy. The war has, however, focused public attention upon the supreme value to the nation of its coal supplies, and upon the fact that coke, gas, and electricity are just coal in different but for some purposes more convenient forms. Was it not recently proposed, much to the concern of the public, that if it became necessary to ration one of these fuels all of them should be rationed, without reference to their availability in different parts of the country, and has not the importance of using them with extreme economy been constantly impressed upon us in recent months ?

After the war the nation will be much poorer and it may have to rely to a greater extent upon its own natural resources, and the need will, therefore, be greater than ever for conserving our coal supplies and putting them to the best possible use. That is the problem in a nutshell, and of the many that face the country it is one of the most important and most pressing. No time should therefore be lost in determining how we can best ensure that the future of fuel is adequately safeguarded. What is the picture as we see it to-day ? The Coal Industry is under the direction of a Department of Mines, a branch of the Board of Trade ; electricity is under the aegis of the Electricity Commissioners, and until recently the Ministry of Transport was responsible for its affairs in Parliament. These have now been added to the multifarious duties of the President of the Board of Trade. Oil in wartime has a Parliamentary Secretary of its own, but formerly it was a branch of the Department of Mines. Gas up till now has been looked after by a small department of the Board of Trade under a Gas Director. It has no Ministry of its own exclusively concerned with its affairs. Such a position has had advantages as well as disadvantages in the past from the point of view of the Industry, but I doubt if it would be right to seek to maintain it in the future. This segregation into watertight compartments for administrative purposes has undoubtedly been one of the contributive causes of the fierce competition, I might almost say reckless competition, which has prevailed for years. Each industry has been fighting for its own advancement, with its own interests as being of paramount consideration. New consumers, both industrial and domestic, had at all costs to be obtained. Each fuel has been boosted often without regard to its suitability for particular needs. These sectional interests have tended to obscure the national interest. It is true that in recent years wiser counsels have here and there prevailed. It was gradually coming to be recognized that where there is community of interest, co-operation is more advantageous than competition. This trend has become more marked since the war began. There has been, for example, the agreed cessation of active competition between gas and electricity. In part this has resulted from the imposition of Government control in various directions, and in part it is due to conditions arising out of the war.

It is practically certain, therefore, that if measures are not taken to prevent it the various fuel industries will at the end of the war revert, if not to the state of affairs which prevailed before the war, at least to something like it. In order to avoid such a result, the first essentials would appear to be that production, distribution, and utilization of all fuels should be regarded as part of a single problem. Some steps have even now been taken in the direction of unified administration of the fuel industries and others are under contemplation. I have already referred to the transfer last month of the electricity supply industry from the jurisdiction of the Ministry of Transport to the Board of Trade. Thus coal, gas, electricity, and oil are all under the same Government umbrella, though the degree of cover afforded differs in each case.

The appointment of Dr. E. W. Smith as Director-General of Gas Supply is undoubtedly indicative of impending changes in gas administration. Dr. Smith, as befits a prominent member of the Council of the Institute, has a wide knowledge of and broad outlook upon fuel problems in general, and his long and intimate connexion with the Gas Industry makes him well suited not only to understand the immediate problems which face that Industry, but so deal with them as to enable it to be fitted eventually into a more comprehensive Fuel Scheme.

By whom then is this comprehensive fuel scheme to be formulated and administered ? We have in the present President of the Board of Trade, upon whom under the existing arrangement the formulation and administration of such a scheme would fall, a man who has a wide experience of fuel in all its branches, and in whom we have great confidence ; he is, however, already charged with many other most onerous and diverse responsibilities. He has to deal with industries, manufactures, overseas trade, commercial relations, trade treaties, and a variety of other most important matters, and one doubts if it is humanly possible for one man to handle so much, and at the same time to devote to fuel problems the time and care which their importance merits.

Speaking personally, as I have already said, I feel that it is not unreasonable to claim that this vital problem should become the sole responsibility of a Minister of the Crown, and in the national interest a Ministry of Fuel should be formed as soon as circumstances permit.

Two main advantages would flow from such unified direction. In the first place, having determined the general principles which would govern production, distribution, and utilization of all fuels in such a way as best to serve the national interest, a single authority viewing the situation as a whole could settle the conflicting claims which would undoubtedly be put forward by the various sections of the fuel industry. I have always felt that each fuel has its proper sphere, that each is better adapted than the others for particular purposes, but in the past, owing to the absence of any authority to prevent it, each has sought to impinge upon what has been regarded by the others as their proper sphere. The result has been in many cases the use of fuels uneconomically both from the point of view of the user and of the State. Again, having regard to the important part which fuel must play in post-war reconstruction, it is most advisable, from the point of view both of the fuel industries and of the Minister and Department concerned with reconstruction, that a single authority should be in control. I have in mind in particular the Ministry of Works and Buildings under Lord Reith. That Ministry has an immense reconstruction programme to carry out and many fuel problems are bound to present themselves. Every kind of fuel need, both industrial and domestic, will have to be met in the most efficient and economical way, and it would be an advantage to all concerned if information as to the best practice were to be obtained from a single source.

In a somewhat less degree the same principle applies in the case of the Service Ministries. They use fuel for a variety of purposes—for example, workshops, barracks, married quarters, and the like. In the past the choice of fuel seems to have depended largely upon the individual predilection of the official making the arrangements for the supply. Obviously there will be less opportunity than in the past for the gratification of individual tastes in the matter of heating and cooking, as in the case of many other things. Blocks of flats built to replace those which have been destroyed will be furnished with cooking and heating arrangements which have been proved the most efficient and most economical for that particular type of flat, and in other dwelling houses liberty of choice will inevitably be curtailed.

Such, in brief, are the views which I personally hold with regard to fuel and the future, and though there may be differences of opinion in regard to matters of detail, all must agree that our greatest natural asset, coal, must be carefully conserved by using it in the most efficient and economical way, at least until we are within measurable distance of obtaining our heat requirements from the sun or some other inexhaustible source, and that the best method of securing those ends is to place the various branches of the fuel industry under unified direction to eliminate wasteful competition and subordinate all competitive activities to the national interest, with a view to ensuring that each form of fuel be put to the use for which it is best suited.

* Presidential Address to the Fuel Luncheon Club, Oct. 22.

The Stourbridge Gas Department has made a gesture to matchless smokers, who are legion these days, by placing outside their showrooms a specially designed pipe and cigarette gas lighter for the use of the public. "Light up again. In war as in peace gas still burns to serve you " says a notice, drawing attention to the service.

Largs (Ayrshire) Town Council have decided that the price of gas be reduced at the expiry of the current quarter to 4s. per 1,000 cu.ft. for ordinary meters and to 4s. 2d. per 1,000 cu.ft. in the case of slot meters.

The Speaker at a recent meeting of Paisley Rotary Club was Mr. Sydney Smith, Gas Manager of Paisley Town Council. Mr. Smith introduced his subject by a tribute to the memory of William Murdoch, the discoverer of gas, and went on to say that the Industry created by Murdoch had expanded to inconceivable dimensions and bewildering variety of products in a hundred years.

A Meeting of the Central Committee of the Federation of Gas Employers will be held in Committee Room No. 1, Gas Industry House, 1, Grosvenor Place, S.W. 1, on Tuesday, Nov. 11, at 11.30 a.m. On the same day there will be a meeting of the Central Executive Board of the National Gas Council at 2.15 p.m.

A Meeting of the National Joint Industrial Council for the Gas Industry will be held in Committee Room No. 1, Gas Industry House, 1, Grosvenor Place, S.W. 1, on Wednesday, Nov. 12, at 2.30 p.m.

THE SECOND TWELVE MONTHS OF WAR

[CONTRIBUTED]

A RETROSPECTIVE view of the events affecting the gas and allied industries gives the impression that the great difference between September, 1939, and September, 1941, has been brought about very gradually step by step, and it may be fairly said we should be thankful that even to-day we have so much freedom. Grumbling about this, that, and the other, continues, and although for a time this may have been suppressed the struggle continued, and now to-day there is very little about which we cannot grumble openly.

The writer's first review of the effect of war on the Gas Industry ("JOURNAL" of Oct. 16, 1940) ended at a time of extreme crisis for this country. The Battle of Britain was in progress. The area over which the fierce air battles were fought included what we call the south-eastern corner of England, the Metropolis, part of the Home Counties, and as far westward from London as Hampshire. All the gas undertakings in this area were aware of the danger and a possibly worse future. Up to the end of August, 1940, some damage to gas-works' properties had been received, but supplies had been maintained.

More extensive, and in one or two cases disruptive, damage, due to enemy tip-and-run bombing, and also deliberate attack on military objectives, was suffered. The alarm was nowhere cause for panic; from public reports and our own knowledge we all have the deepest satisfaction in the Gas Industry's staunch and continued determination to resist the most hopeless and desperate outlook, and its ability to get working after the raids had ceased. The number of gas supplies which have been interrupted temporarily has been relatively small.

In addition to bombing, Dover and nearby districts have been the target on innumerable occasions by the German long-range guns on Cap Gris Nez. This town and the surrounding districts have our double consideration, and it is to the credit of the Gas Industry that whatever and wherever help had been needed, assistance from surrounding undertakings not in such bad straits has been given.

At this quiet time in the midst of a long lull, the Editorial opening of the "GAS JOURNAL" dated Sept. 4, 1940, will perhaps bring us back a little to the reality of war and the difficulties which have been surmounted.

Reference at this stage must also be made to the "GAS JOURNAL" review of 1940, which, having regard to the space available week by week, dealt most thoroughly with the history of the preceding twelve months. The main comparisons made with the state of affairs in 1938 and 1940 help us to assess the high standard which has been maintained.

Before passing on to items of interest, a reminder that the "GAS JOURNAL" published on Feb. 12 of this year a useful list of war emergency legislation affecting the Gas Industry may be helpful. Since then several important Orders have been enforced. Among these may be quoted the Fuel and Lighting Order, 1941, which repeals the provision respecting the quantity of coal and coke to be acquired or supplied by controlled premises; the Control of Tar Order, 1941, limiting the quantity of tar to be acquired during a complete year. This Order, General Licence (No. 1) granted by the Secretary for Mines, is in fact a licence to sell limited specified quantities.

The Gas Supply (War Damage) Order, 1941, dated April 1, was issued by the Board of Trade under Regulation 56, and deals with the supply of gas of an undertaking's declared calorific value being either in quantity or quality interfered with by enemy action, in which event the undertaker, having paid due regard to the details of the Order, shall not be liable for payment on account of default.

Prominent among general legislation must be placed the War Damage (Business Scheme) Order, 1941, and the War Damage Act, both of which have already been reviewed in the "GAS JOURNAL." Affecting the manufacture of by-products, the Sulphuric Acid (Charges) (No. 1) Order, 1941, dated March 4, was issued by the Treasury, and requires the payment by acid producers of a charge, the monies received ultimately reaching the Ministry of Supply Sulphuric Acid Control.

To offset the disadvantage of carrying cylinders of gas for propulsion, the Road Traffic Act, 1930, has issued a Regulation allowing vehicles of certain unladen weights to travel at higher speeds.

There are several Orders relating to the Control of Iron and Steel and also the By-Product Industry—namely, the Control of Fertilizers (No. 1) Order, 1939, and the Sulphate of Ammonia (Charges) (No. 1) Order, 1940.

To prevent the raising of the price of gas, except by licence from the Board of Trade, an Order entitled the Defence (Gas Charges) Order, 1941, dated May 26, was made by the Board of Trade, to which later was applied means whereby the price of gas could be increased to consumers of 150,000 cu.ft. and over per annum.

Of interest to the Gas Industry is the appointment of Sir Frederick West as Chairman of the North-Western Area Board of the Ministry of Supply; Sir Frederick, who was nominated as President of The Institution of Gas Engineers in June last, has, it is felt, the good wishes of everyone.

Throughout the period technical matter appearing in the Gas Press has remained of a high standard, and many interesting papers and articles, some of particular merit as being topical, have been published.

The review of the first year of war instanced the catering possibilities for the Gas Industry, and attention was drawn in the "GAS JOURNAL" to the issue of the Factories (Canteens) Order, 1940. Advantage has been taken of this wonderful chance, and from the extent of the work done and in hand it would appear that the Gas Industry has proved itself most capable of supplying the heat required and providing the catering equipment.

The happy introduction in the early part of 1940 of publishing descriptions of American gas practice continues and is of more than technical value. From knowledge to hand, the American Gas Press is reciprocating; this mutual Anglo-American effort will help to enable each in his own way to form closer relationships with the other. Particular mention may be made of the article by Cline and Segeler published in the "GAS JOURNAL" on March 12, 1941, stress being placed on the concluding remarks, "a hint of things to come," from which the Authors feel that there is a substantial chance that where speed and refinement are an advantage prepared gas atmospheres will do the trick. The experiments on direct reduction of iron ore with special atmospheres made from gas point to revolutionary changes in this process.

The joint gas and electricity agreement to avoid advertising during the war period appears to have been strictly applied, and after much agitation—and, it is feared, some misunderstanding—arrangements would appear to have been made with the Mines Department for a rather stilted form of prestige advertising. The manner in which the Industry has risen to the occasion, and the example of carrying on under difficult conditions, deserve that information should reach the public. This would not be the type of advertising considered in the agreement.

A work of recent publication, *Municipal Trading*, by H. Finer, deserves the closest study. It is written in a most attractive style, is well documented, and although there are several matters pertaining to gas, the local details of which, if in the hands of the Author at the time the book was written, may have altered his opinion, the fact still remains that as a whole the work is of great value.

There is throughout the Industry a greater tendency than ever to help each other, and the effect of regulations concerning Protected Establishments, the Essential Works Order, the Firewatching Order, the camouflage of gas-works, and along with these the difficulties which have been experienced in securing adequate coal supplies and maintaining skilled and unskilled labour at an economic level, should go a long way towards unification and co-ordination within the Gas Industry, and it can already be seen that this joint effort experienced within the bounds of one Industry is having its effect nationally.

During the period the country has been divided into regions, and attached to each Regional Commissioner is a Gas Engineering Adviser whose job has been, although not easy, very much lightened by the response obtained from the constituent members of each region. Much valuable assistance has been given from one undertaking to another through the Adviser's organization, much work in the organization has been done, but there is yet considerable ground to cover before it is felt that the standard of readiness required for the Gas Industry, a most vulnerable concern when all is said and done, has been attained.

Brief mention has been made of the coal difficulties, and if we look back to September, 1940, when the average gas undertaking's coal stock was low, we find that nationally, after having completely to reorganize production, we are in little different position. In the autumn of last year representations were made to the Mines Department to supply coal of suitable quality irrespective of any other consideration: this was rejected by the Mines Department, and during the last twelve months undertakings have therefore been forced to prepare themselves to meet not only increased charges for coal and freight, but to take any class of coal available. To take the broad national effort view, most gas undertakings are able to accommodate most classes of fuel, some are perhaps better placed than others, and there may be a few in a position to deal with only one particular class.

In addition to its many and complicated duties, the National Gas Council has pursued the coal position throughout the war period and has maintained continual contact with the Mines Department.

It is interesting to note that on coals, increases have occurred in price up to 25%, coke has increased by 30%. Increase in revenue has been secured from the sale of coke. Gas—and rightly, for this is our main product—has received increases in price, and continues to form the bulk of our revenue. In the collection of gas accounts evacuation, re-evacuation, and the damage sustained by residential property have made the task of tracing consumers very difficult.

The Transactions of The Institution of Gas Engineers in June, 1941, were adorned throughout with the mantle of a new and thrilling novel, or an exciting movie, the end of which gives a general desire for more. It was in keeping with the present mood, and admiration for the departure was on everyone's lips.

The President gave those not wishing to give prepared contributions to the discussions a chance to place their ideas briefly before the Authors. This opportunity did not bring out the quantity or quality one could wish for; the President's offer, in fact, was just too much for us, and a chance of a lifetime may have passed.

The significant feature of the Symposium itself is to be found in the Authors—all spectators and active ones at that, but not one, at the time of preparing his Paper, a practising gas engineer. Each is intimately connected with the Gas Industry, but it is doubtful whether all have been able correctly to draw out the inner feelings of the Industry. A criticism which can be offered is that one Paper at least should have been by an engineer and/or manager whose daily life and effort are mainly devoted to the business of gas production and administration.

The Papers themselves were the essence of their subjects; they were to the point and written with due regard to clarity and brevity, and

although in one Paper attention was drawn to verbosity, much of the discussions tended in this direction, and came, in some instances, to about the same quantity as the Paper under consideration.

The Symposium was a departure intended to "get at" all the minds of the members. This, it is believed, did actually happen, and it is thought there is more "under the hat" than was spoken or written. Murmurings continue, various aspects of the future crop up from time to time, committees are being set up for this and that, and if we only move quickly enough we may save our faces. Our skins are already badly scorched.

The assignment of offices and duties is far from reaching out to those only too willing to serve. To many the continued grouping of or re-grouping of the same members spells banishment; and the newly trained members with fresh minds, those who will be required to fulfil the future, do not appear to be wanted. If every member who desires was allowed to do some kind of work towards this future the function of the Institution would be fulfilled.

Another important matter is the formation of the Gas Research Board. This, it is thought in many quarters, has been too hastily put over and may not secure the support it deserves. Every active member of The Institution of Gas Engineers has been aware for years past that the goal was co-ordinated research; but from members any actual individual money contributions to research requirements would be insufficient to work even in a small way. The success of the Board depends on the response of the corporation members, and those who signed their names to the articles of association may find themselves either alone or liable for heavy responsibilities. There is a lack of clearness as to the scope. To put one pertinent question: Are private research enterprises to be co-ordinated, and if so, will the Research Board foot the bill. It would be invidious to mention any particular private research effort; sufficient, it is thought, that an inference can be drawn.

The use of gas as fuel for motor vehicle propulsion has made little headway, but as circumstances may favour the Gas Industry, and as there are hundreds of places where low-pressure gas can be obtained, an increase for this purpose may be looked for. On the other hand, the Ministry for Mines appeal for general fuel economy must be respected and any new uses for gas not in the national interest must be restricted.

Several instances come to notice of the re-declaration of calorific value at a lower figure, and the Gas Industry's whole energy must be directed towards saving fuel, economy in the production of gas and coke, and the maximum production of benzole.

TECHNICAL ADMINISTRATION AND COSTING IN A GAS UNDERTAKING

PAPER TO THE MANCHESTER DISTRICT ASSOCIATION OF GAS ENGINEERS, OCT. 24, 1941

By THOS. HAWORTH,

Engineer and General Manager, Darwen Corporation Gas Department

PERHAPS the subject which is being most widely discussed in the Gas Industry to-day—apart from the price of coal—is the possible and probable grouping of the activities of the Industry under a central authority.

The electricity industry has its Electrical Commissioners, the coal industry has its Coal Commission; may not the Gas Industry soon have its Gas Commissioners or Gas Commission also?

The movement for centralized co-ordination in industry is not confined to public utilities. It is part of the general steady change in social and industrial relationships, which was given great impetus by the first world war 1914–1918 and which is being accelerated by the present war.

The following extract from the Report of the Macmillan "Committee on Finance and Industry" of 1931 is an excellent preface to the matters to be considered in this Paper: "In the development of every civilization there comes a stage when reflection awakens. While a nation is in the making it is so preoccupied with the practical business of making a livelihood and establishing a position that it has no time to bethink itself. Of our own nation it may pre-eminently be said that it has attained its great position not by pursuit of any preconceived plan, but by a process of almost haphazard evolution based on trial and error and aided by the practical aptitudes and instincts of our race; as well as by certain fortunate accidents in the way of natural resources and geographical position. There has been little conscious direction of the national activities to definite ends. The policy compendiously known as *laissez-faire* has prevailed. To this trust in the operation of natural causes we owe the development of our great political, financial, and social institutions, and the amazing growth of our financial activities. But we also owe to it our deficiencies, such as our industrial instability, our social maladjustments, our slums . . . and as a consequence . . . Parliament finds itself increasingly engaged in legislation which has for its conscious aim the regulation of the day-to-day affairs of the community, and now intervenes in matters formerly thought to be entirely outside its scope."

This is equally true of the development of the Gas Industry, and in the face of this great process of rationalization it is no longer possible for any undertaking to "keep itself exclusively to itself" or to pursue exclusively its own immediate interests. Hence, in this survey of the growth of the Gas Industry, attention is paid to the forces which are beyond control of the Industry and which have compelled major developments in gas supply practice, particularly since 1914.

The movement for the national co-ordination of the activities of all public utilities, characterized by amalgamations, the formation of regional councils, the appointment of national commissioners and the like, aims at effecting substantial economies in the general administration and operation of these industries. Each individual undertaking in a public utility can similarly effect substantial economies (if it has not already done so) by the application of the same principles in the co-ordination and direction of its detailed activities.

It is convenient to consider this aspect of this movement in terms of the various operations to be performed and the jobs to be done which are common to all undertakings, together with the records required for the effective carrying out of these tasks.

This movement has two aspects: an outer concerned with the grouping together of undertakings by amalgamation, holding companies, joint Gas Boards, and so on; and an inner concerned with the co-ordination of activities within each individual undertaking.

The internal aspect of this drive for commercial efficiency by co-ordination has again two aspects. The purely technical, such as improvements in processes, waste heat recovery, and scientific plant control, falls under this heading, and the technical administration, which in these days is based upon an analysis of actual working costs. It is with this analysis that I am concerned to-day.

The analysis of working costs or cost accounting is usually regarded as something which only the larger undertakings can afford to have as the basis for the technical administration of production and distribution.

The technical analysis of working costs, which has come to be spoken of as cost accounting, is a development associated with the planned production and distribution which characterizes modern engineering production—in short, mass production.

The application of the principles underlying this technical analysis of costs in the engineering trades, to the peculiar problems of gas distribution, utilization, and sales was originally worked out in 1924 by the Author of the *Science and Practice of Gas Supply* and published in a book called *The Scientific Promotion of Gas Sales*. In this work a system was worked out in full detail which could be applied to any undertaking. It had, however, one major fault: the various stages of the costing system involved the use of too many different rulings; it was satisfactory for undertakings with a relatively large and skilled staff only.

In 1928 as Engineer and Manager of the City of Ripon Gas Undertaking I looked for a system which would satisfy the requirements of a small undertaking, and as the outcome of discussions with the Author the conclusion was reached that the time had arrived when it was necessary to simplify the whole matter so that the smallest undertaking could afford to install and operate a system on these lines. The necessary modifications were worked out to meet the requirements of a 70-million works and put into operation.

In 1935, on taking over my present position, I was asked to reorganize the Stores and Accounting Systems, and keeping in mind other factors I introduced the Job Voucher System. These main facts guided my decision: I required—

1. An efficient system.
2. An assured stock accuracy (and by stock accuracy I mean *all* stock from a $\frac{1}{8}$ in. barrel nipple to the largest industrial appliance.
3. Accountancy accuracy.
4. Daily rendering and the avoidance of the duplication or non-rendering of accounts for all chargeable work done.
5. A system which would appeal to the men's intelligence.
6. A system which would protect both the undertaking and its servants.
7. To eliminate dishonesty.
8. A system which would assist and improve the Sales Department.

You will agree that I aimed very high indeed, but I can give you my assurance that in actual practice not only were these objects achieved, but many new and unforeseen benefits were gained. Our Yorkshire friends tell us that "the proof of the pudding is in the eating," so I will, in describing the system at work, endeavour to show just how these objects were realized.

Before a start could be made I was faced with the fact that one of the foundations of success would be an absolutely correct stocktaking, and not only that, I had to be sure that we could count on stock accuracy in the future, so on March 31, 1935, the stocks were doubly checked.

To guard against future inaccuracy of stocks I introduced for the storekeeper's use two bound books numbered consecutively and in duplicate form, one to be used for a daily return of all goods received, and the other for goods returned, such as empties, breakages, goods not to standard, meters for repair, etc.

These daily returns are handed in each morning to the control or costing office and entered direct into the stores ledgers, and, as we are not a self-contained undertaking, into a Goods Received Book for the benefit of our Treasurer's Department. I consider the fact that the stores ledgers are not kept by the storekeeper but away from the stores altogether by a clerk in the costing office to be very important indeed. It tends not only to be a double check on the stores, but also on the integrity and efficiency of the storekeeper himself. Also this system eliminates entirely any possible danger of accounts being passed for payment unless the goods themselves have been received—*e.g.*, the goods must have been entered in the stores ledgers before the seller's invoices are entered. Should an invoice be received without the goods being entered they would not in any circumstances be passed. Incidentally, all the accounts are passed by the Costing Department. So much for the stores side of the job. Now to the work of the Job Voucher. If you will be good enough to turn to the sample Job Voucher Sheet provided it would help considerably.

These Job Vouchers are in duplicate, and are bound in books of one hundred, with each voucher numbered consecutively. The vouchers are printed in six colours (in separate books, of course), with each colour appertaining to the work concerned:

e.g., Pink	..	All work in connexion with Mains and Services.
Green	..	„ „ „ Meters.
White	..	„ „ „ Lighting fittings.
Yellow	..	„ „ „ Supply and fixing of appliances.
Blue	..	„ „ „ Works.
Orange	..	„ „ „ Property.

(My undertaking owns a considerable amount of house and shop property near and around the works.)

Complete sets—that is, six books—are kept at the showrooms, the Distribution Superintendent's Office, the Works Enquiry Office, and Works Foreman's Office, and are issued by the Costing Department, to whom also completed books are returned.

It would be interesting at this stage to follow the progress of a Job Voucher from the time an order is placed at the Showroom for, shall we say, a gas cooker on five years' hire purchase. The full particulars are entered on the top of the voucher—that is, name, address, time and date received, time to call, date of fixing, whether hire purchase or otherwise, cash price, agreement number, hire purchase period, 3 or 5 years, first instalment receipt number, and amount paid. Then below, the nature of the work to be done and any special instructions—*e.g.*, "Supply and fix one No. X gas cooker complete with gas match, fix on right-hand side of gas boiler." The voucher is then torn out, leaving bound in the book a duplicate copy, and passed on to the works for the attention of the Distribution Superintendent. He books on his monthly calendar the date of fixing and other appropriate particulars, then files the voucher in an indexed file under the date of fixing. I would add that this indexed file is made up as a two-monthly diary and is also indexed as follows: "Goods on order" (the vouchers placed here are for special goods ordered for the consumers but not yet received); "Awaiting consumer's instructions" (the vouchers placed here relate to estimates, to orders, and to consumers who have placed an order and have promised to let us know at a later date when to fix); "Awaiting access" (vouchers are placed here when fitters have been unable to get admission and the job is held over as a consequence); "Awaiting fitter's attention" (this is work to be done immediately labour is available).

Then follows the month and the dates as previously mentioned.

It will be seen from this explanation that the Distribution Superintendent has at all times the programme of work for his Department ready to hand.

Back to the Job Voucher; the day before fixing is promised it is handed to the storekeeper, who prepares the cooker and fittings required and enters them at the back of the voucher under the "Deliver" column together with the materials required, such as ½ in. lead pipe, ½ in. cooker stop tap, &c. At the bottom right-hand corner he also fills in a full description of the appliance, including hire purchase badge number, &c. The cooker and materials are then, if practical, delivered ready for the fitter to follow on to the next day. Both the vanman and the fitter carefully check their materials with the voucher. The fitter when going on to the job puts his starting time and check number on the front of the voucher along with that of his labourer, if any. Upon completing the job he fills in the finishing time and obtains the consumer's initials against these times; the consumer signs twice on the back of the voucher at the bottom. This is very important. Not only is the working time of the man covered for the Department, but the man himself is covered should any dispute arise at a later date. We are all acquainted only too well with that fortunately rare but peculiar consumer who upon receipt of his account commences to dispute time spent on the job. These people are usually the type who do not want to pay for anything. On more than one occasion such a dispute has cropped up months after the work was completed, but it was only necessary to turn up the voucher to show the disputed time signed for by the consumer as correct. I would add here that since the introduction of the system, disputed accounts have been reduced to a minimum. The fitter having completed his job passes on to his next and inserts on his new voucher the time left the previous job. In conjunction with the voucher each man has a daily time card, a sample of which is in your possession; he books each job voucher number down on this card along with the time under the appropriate columns, and hands this in together with his completed vouchers to the Distribution Superintendent the following morning. The time card is then checked against the corresponding entry on the job voucher and at the same time analysed to the nominal heading—*i.e.*, Mains and Services, Fitting Appliances, &c., thereby assuring correct allocation. The card is then used for wages computation.

You will see so far as we have progressed that the stores issued are recorded and checked by the entry of the materials on the back of the voucher by the storekeeper, and then the check of the vanman and/or fitter whose responsibility they have become. Any materials not used are handed back to the storekeeper and entered under the return column and then netted out, before the voucher is handed in to the Distribution Superintendent.

From the undertaking's point of view every minute of the workman's time is accounted for, and unproductive time so far as is humanly possible is eliminated.

From the workman's point of view he knows he is protected from any suggestion of wasted time or dishonesty, and he realizes that he is paid a fair day's wage for a fair day's work.

The showroom attendant has a copy of all orders taken, cash transactions, and hire purchase records at her finger tips. This also ensures the promptness of sales returns, &c., and does certainly ease the work and improve the efficiency of the showroom staff. From a prestige point of view the danger of a consumer being let down on a promised fixing is eliminated.

I am of the opinion that an undertaking may spend pounds on goodwill advertising, which can be utterly wasted unless there is behind that advertising a foolproof sales and service organization. You will all agree that a broken promise, a slovenly workman, or a tactless member of the staff can in a few minutes destroy all the efforts of a front page in the local Press. To me the introduction of the system has been worth while alone for the increased prestige it has brought to the undertaking. It has helped not only to put over to the public the slogan "Gas never lets you down," but equally important, for one is no use without the other, that "the Gas Department never lets you down," and I am sure that this should be the main ideal of every gas engineer.

From the yearly final accounts, one is certain that expenditure either on the works or distribution side is analysed to its correct nominal, and that the figures presented to the Committee or Directors are definitely a true and correct account of the stewardship.

So much for a summary of the advantages gained. Now we can take up the history of the Job Vouchers where we left off. The voucher is initialled by the Distribution Superintendent that the job is correct in every way. He also stamps the date in the appropriate place and passes it on to the costing office. Here the materials are booked out of stock and the net cost of each item entered against them. You will notice that the voucher is headed "Material 1," "Appliance or Appliance Parts," and "Material 2." Under the first goes all the main items, lead pipe, sundry fittings, &c.; under the second the appliance itself, and as in our sample job the gas match. The third column is reserved for small sundry materials, such as waste, nails, and very small items which can be grouped together. You will see as we go on the reason for keeping the cost of materials and the appliances separate. The material now having been dealt with, the costs are totalled up in their respective columns and transferred to the costing summary on the bottom right-hand side of the front of the voucher. The labour is then calculated and dealt with as follows: We will presume in our sample case that the fitter and labourer worked on fixing the cooker from 8 a.m. to 5 p.m. on Monday. The record on the voucher will then read as follows:

Check No.								
Fitter or Ser'man.	Labr. or Appr.	Time left previous job.	Time commenced.	Time completed.	Init. of Consumer.	Ord. time.	Over-time.	Rate*
48	30	—	8.0 a.m.	5 p.m.	C.B.	8 hrs.	—	3/2

* For convenience and efficiency the two hourly rates are added together, *e.g.*, Plumber 1s. 10½d.
Labourer 1s. 3½d.
3s. 2d.

The total amount is inserted in the rate column, so we have 8 hours at 3s. 2d. per hour. This is then extended to the time cost column and tram fares, district telephone calls, or any similar expenses put into the expenses column. Should the job be a large one and last for a few days, this same procedure is carried out and the whole time and cost totalled up in the same way. The time cost is then transferred to the costing column and put in against its respective heading.

We now come to oncost. In our sample case we have two men working 8 hours, in the oncost column 16 hours would be inserted at whatever fixed oncost is calculated by the Department. In our case this was fixed at 6d. per man hour, and after two years' working was reduced to 4d. per man hour. This oncost was calculated on the following items:

Supervision (portion of staff salaries).
Insurance (Workmen's Compensation Act, &c.).
Tools (cost of replacement).
Maintenance (appliance scheme general).

This oncost figure can only be determined by each individual under-

taking for itself, and depends on the overheads. The point I would like to stress here is that in the oncost figure, whether it be a chargeable job or a standard district repair job on the mains, the items mentioned are included and do give a true and accurate cost to the Department of every job carried out. You will all realize the importance of these ready-to-hand statistics—just how much they meant to my own undertaking I will illustrate later.

We now have the voucher ready for final costing. The expenses (if any) are inserted, transport time, which we estimate costs us 3s. per man-van-hour, is entered, costed, and totalled in the net cost column. In the total cost column is entered the selling price of the appliance, the difference between the two being the trading margin. One can at once see if a profit or loss has been made. Everyone present will realize that this information alone, especially in these days of jumping prices, is of tremendous value. It is no longer necessary to wait for half yearly or yearly figures of trading results, since up-to-date information can be obtained each day. In our own case, in common with many undertakings, we had fixed prices for all appliances, based on a percentage margin on net cost, plus a decided fixing charge. Within the first weeks we were able to see if we were working on a sufficient margin or otherwise. In many cases we found ourselves just right, but in at least one instance we were able to reduce prices, and in another we had to increase the charges to effect a balance. In this latter case it was domestic water heaters. We had been working on something like a 30s. margin on net cost of the appliance, which was found to be hopelessly inadequate under the revealing facts of the job voucher system. The same applied exactly to private work jobs, lighting fittings, &c.

Here I would like to say that in my opinion the sales and fittings side of the Industry should be self-supporting. It is not practical nor fair business for it to be done otherwise, and from the undertaking's point of view leads only to discrepancies. If one fixed 50 water heaters per week (and bearing in mind the future maintenance of such appliances) with a loss of £1 on each appliance, it would be years before the undertaking actually felt any benefit. By that time, taking everything into consideration, I doubt whether the transaction would have helped the undertaking in the least. We have no need to give any of our first class appliances away—the public have never in the history of buying and selling objected to a fair margin of profit to the seller of a useful and essential article—and what Industry has better or more useful appliances to offer?

With the final costing of our voucher, it is now, together with the various other vouchers for the previous days' completed work, sorted in its respective colour group. You will recall that these colours represent the various type of work—pink is mains and services, &c.—so the costing clerk in sorting automatically places the vouchers under their nominal headings. Having done this, he goes through each particular group, noting the allocation whether "Sale," "H.P.," or "Free," and immediately makes out his invoices. In a space provided on the left-hand side of all our invoices the Job Voucher number is inserted so that should any enquiry arise the voucher can be turned up at once. Here I would add that in a few minutes we can furnish a complete historical record of any job done by the Department since April, 1935. It is traceable from (*a*) approximate date, (*b*) name, (*c*) address, (*d*) type of appliance or work, or (*e*) account number. Each "Sale" voucher is stamped "Account Rendered" as soon as it is dealt with. The hire purchase details from the vouchers are entered into a "Hire Purchase Record Book." This book, as in the case of the Goods Received Book, is kept only for the benefit of our Treasurer's Department.

The vouchers are now costed. The clerk responsible for this first of all ascertains that all accounts have been rendered and hire purchase records entered. He then from his vouchers makes the cost ledger entries. You have before you a sample sheet taken from this ledger, and I should be obliged if you will turn to this while I explain its use. You will observe that the ruling on the left-hand side is a reproduction of the items of cost from the job voucher.

The ledger is indexed by tabs similar in colour to the various vouchers and marked under their appropriate headings—"Mains," "Services," "P.P. Meters," &c. Under each heading the cost ledger is subdivided and worked up to cover every possible kind of job. "Mains" separate section for "New Mains" (Capital Expenditure), "Mains Repairs," "Mains Renewed," and cost ledger sheets are included in each section for every size of main. For instance the top right-hand corner of the cost ledger sheet would read as follows:

Section	.. ..	Mains.
Sub-Section	.. ..	New Mains, Size 2 in.

In entering our sample voucher the clerk would turn to the Yellow Hire Purchase index, Section Cookers, Sub-Section, 5 years' hire purchase, and working left to right enter the particulars from the Job Voucher costing column as follows: Date, Job Voucher Number, Labour, Oncost, Material 1 (Net Cost), Appliance (Net Cost), Appliance Parts (Net Cost), Material 2 (Net Cost), Expenses, Transport, and the total under "Net Cost of Job." Under "Hire Purchase First Payment" Column is put the first deposit, and after subtracting this from the net cost we have the figure for the net capital expenditure column. The trading margin or loss column is next dealt with and arrived at as described earlier. Under "Total Charge" is inserted the selling price. The next heading relates to Borough Treasurer's Return or Stores Ledger Folio, and here again this is a section which would not be needed by a self-contained undertaking, but in our case we have to make a monthly return of the value of goods issued and their respective nominal in Mains and Services, P.P. Repairs, &c. This is quite simply arrived at as each section of the Cost Ledger is added up monthly and the return is obtained by extracting the appliance and material totals, and as they are already allocated in their sections, the analysis is completed at the same time by putting the totals under the respective nominal heading on the Return sheet. A self-contained undertaking could, of course, post direct from the Cost Ledger the monthly, half yearly, or yearly totals, as required.

We next come to the comparison Fixing Cost and Charge columns. Under "Actual Cost" is entered net cost of fixing, this being the net cost of the job less the net price of the appliance. The standard charge is arrived at by subtracting the net cost of the appliance from the selling price. The end column, "Extra Charges", is used only when, through extra work, the standard charges have to be increased.

On the opposite side of the cost ledger sheet we have the analysis of costs which are self-explanatory. In the actual Ledger, of course, these two sides of the cost sheet face one another and any information required can be seen at a glance. I would like to point out one or two interesting points on the analysis side of the sheet. You will notice under the "Numbers" column "Fixed and Returned"; this is used in connexion with the meter section of the cost ledger as well as with the appliances section. You will appreciate that these statistics are very useful for monthly guidance and for Annual Report figures at the end of the year. "Length in feet" column gives us quick information of miles of mains, &c. Under the analysis of meters fixed and returned is put, in its respective column, the size of the meter, this being a double check on the Meter Stock Record.

A separate Meter Stores Ledger is kept apart from the Stores Ledgers. In brief outline this is a loose leaf book, thumb indexed (*a*) Ordinary Meters, (*b*) Prepayment Meters. Each section is divided into meter sizes and subdivided into every maker's name, so that it is possible to see at a glance the exact meter stock, while throwing into relief any particular make or size of meter passing too frequently through the meter repair shop; and here I would say that in connexion with the meters the job voucher system is shown to its best advantage. On the fitter making a meter change, the storekeeper fills in a full description of the meter to be fixed on the bottom right-hand corner, including state, &c., and the fitter enters the full particulars of the meter he removes, on the opposite side. These particulars are checked by the storekeeper on the meter being handed in. The meter job vouchers are handed to the meter inspectors each morning and they adjust their books accordingly. The advantages are obvious and important:

1. No meter can possibly be fixed without record.
2. Accuracy of gas accounts is assured.
3. Meter stock accuracy is also assured.

(The meters are booked out of stock and debited in the Meter Stores Ledgers each day.)

After entry into the stock ledger, the particulars from the vouchers are entered on the Department's Sales Census Cards, which are kept as an extra link with the system. A sample card is before you; there is one of these for every house in the area of supply, and by turning up the card, one can tell at a glance what appliances are fixed—the size of meter and the consumption record.

Afterwards the vouchers are sorted in number order, and filed in the voucher cabinet, until the completed voucher book is returned to the costing office, when they are checked to the book, thereby assuring that no vouchers are missing.

The books with the completed vouchers are put away and we have through these a library of all work carried out since April 1, 1935.

In conclusion I hope I have succeeded in proving that we have adopted a simplified system which has achieved its object and is equally applicable to the largest and smallest undertaking. While the subject has been handled as a domestic matter, I consider it to be an essential factor in enabling an undertaking to consolidate its position ready to take its place in a more unified system of national control.

If the golden age of the Gas Industry is to lie ahead of us and not behind us, we must be so organized individually and harnessed together collectively that our Industry can march forward fully equipped to meet the intensified competition of a post-war period.

NEW PATENTS

Cleaning of Gases

The Whessoe Foundry and Engineering Company, Ltd., and A. E. Taylor have been granted a patent (No. 539,043; application date, March 5, 1940) concerning a process for removing oily matter from gases by treatment in a disintegrator followed by treatment in an electro-detarrer.

The invention consists of apparatus for carrying out the process comprising essentially a disintegrator gas washing fan or cyclone separator and an electro-precipitation separator arranged in series.

An important feature of the invention, in its relation to the cleaning of gases containing tar, is the circulation of liquor heated by the gas under treatment as a means of partially cooling the gas whereby the plant effluent is reduced, part of the heat of the gas is conserved in the liquor system, and the recovered tar is maintained at a temperature such as to ensure a viscosity which will permit it to be readily pumped.

The drawing illustrates a plant designed for the cleaning of gases containing tar.

Referring to this drawing, A designates a precooler, B the disintegrator, C a spray separator, D an after-cooler, and E the electro-static

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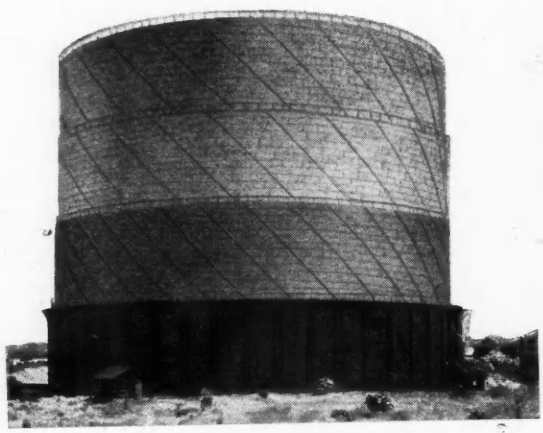

Gas Holder painted with 'Ferrodor' Paint

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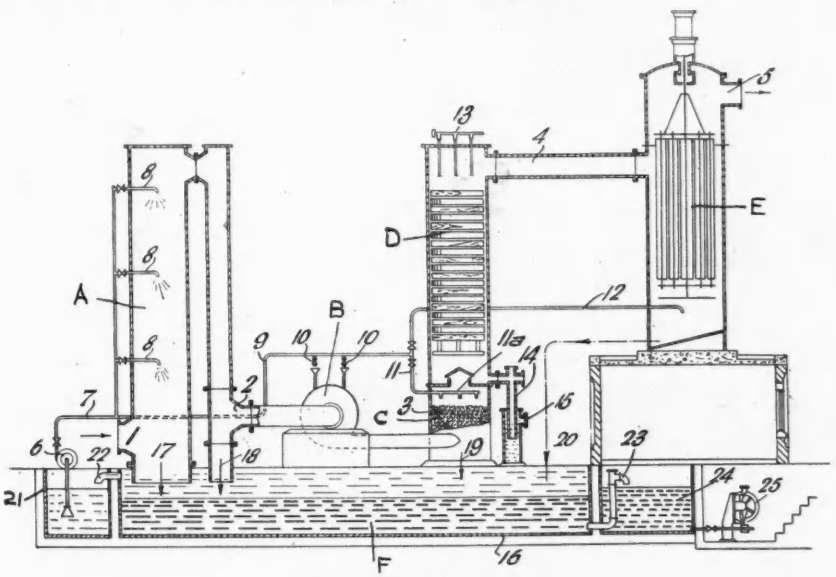
precipitator, all these elements being located above a liquor collection and separator tank F.

The crude gas to be cleaned passes into the precooler A by way of the inlet pipe 1 and passes from the precooler A by way of the pipe 2 which leads into the disintegrator, gas washing fan, or cyclone separator B from which the partially cleaned gas passes to the spray separator C which is preferably packed with suitable material, such as Lessing rings, as indicated at 3, over which liquor is sprayed as will hereafter appear. From this spray separator the gases pass upwardly through the after-cooler D which may be of any known construction, and is indicated in the drawing as a grid-filled tower. From this after-cooler the gases pass by way of the pipe 4 to the electrostatic precipitator or electrodetarrer E in the form of a mist, and the gas, cleaned thoroughly by electrostatic precipitation, passes out at the outlet 5. Intense spraying of the heated gas passing into the precooler A is effected by means of liquor pumped by means of the pump 6 through the pipe line 7 to the valve controlled sprayers 8 and washing and cooling liquor is similarly supplied to the disintegrator B from the same source by way of the branch pipe 9 and valved pipes 10. The pipe 9 conveys liquor to the spray separator C through the valved pipe 11 and sprays 11*a* and also to the electrostatic precipitator or detarrer by way of the pipe 12.

Cooling water is supplied to the after-cooler, as indicated at 13, and passes out by way of the pipe 14 and seal outlet 15 and may be passed through an oil separator the separated oil being passed through



Plant for Cleaning Gases.

a launder to a sump and delivered thence to the settling or separator tank 16. The circulated liquor drains back into the settling or separator tank 16 by way of the water seals 17, 18, and 19, and the deposit from the electrostatic precipitator or detarrer also drains into this settling or separator tank 16 as indicated at 20. The pump supply chamber 21 is fed continuously with liquor from the top of the settling or separator tank 16 by way of the pipe 22 and the tar settled or separated of low viscosity by reason of its temperature, flows through the discharge pipe 23 into the tar collecting tank 24 and is pumped to the desired location by the pump 25.

It will be seen from the foregoing that the gas to be cleaned is treated continuously in two cleaning stages, the first stage cleaning being by means of a disintegrator, from washer or cyclone separator, and the second stage by electrostatic precipitation; by this means the last traces of oily matter are extracted or precipitated.

The circulating liquor is preferably maintained—for example by means of the sensible heat of gases assisted if necessary by steam coils or the like—at a temperature of from 70°C. to 75°C. and the gas being treated is precooled by spraying this hot liquor into the precooler A, while the recovered tar, being maintained at this liquor temperature in the manner indicated, has a viscosity sufficiently low for it to be pumped away and subsequently used as fuel.

Gas Fires of the Inset Type

Radiation Ltd. and H. Hartley have been granted a patent (No. 538,496; application date, April 23, 1940) relating to gas fires of the inset type.

Such a fire, it is pointed out, has an open top, and is adapted to be inserted in the cavity of an ordinary coal fire grate, the height of the fire being less than that of the cavity. When the fire is mounted in position a gap inevitably occurs between the top of the fire and the upper portion of the grate. This gap is objectionable because it is unsightly, and also because it may set up a condition which interferes with the efficiency of the fire. The invention has for its object to avoid these undesirable conditions.

The invention comprises a refractory baffle made separately from the gas fire and adapted to be supported in the gap preferably in a rearwardly inclined position above the fire, and also adapted to divide the gap into two (front and back) passages, one of which can conduct hot gases from the gas fire and the other air from the room to the chimney of the grate.

Fig. 1 *a* indicates a gas fire of the inset type, and *b* indicates a coal fire grate cavity into which the gas fire is inserted, the cavity being bounded at its rear by the firebrick back *c* of the grate, and at its upper end by the lower edge of the canopy or like part *d* of the grate.

A refractory material baffle *e* is constructed in the form of a flat slab provided with side flanges e^1 and adapted to occupy the gap which exists between the upper part of the fire *a* and the lower edge of the canopy *d* of the coal fire grate, this gap being visible from the room in a wall of which the cavity *b* is provided.

The baffle *e* may be supported by resting it on the upper ends of the side portions of the fire and with the rear edges of the flanges e^1 in contact with the firebrick back *c* of the grate. The baffle *e* is such that when in position its lower edge lies adjacent to the upper ends of

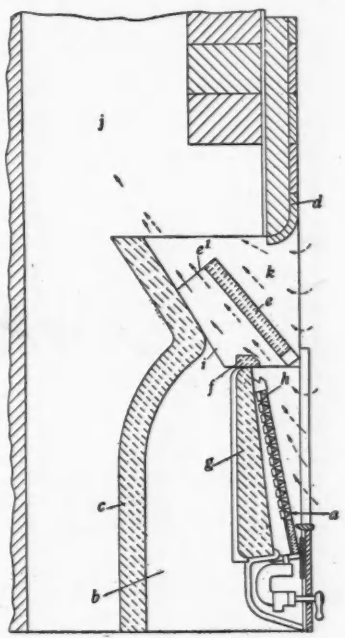


Fig.1

A New Gas Fire.

the radiants *h* of the fire and forms the entrance to a rear passage *i* which leads to the chimney *j* and which is bounded by the firebrick back *c* of the grate and the rear surface of the baffle, this passage serving to convey hot gases from the open upper end of the gas fire *a* to the chimney. The region bounded by the rear side of the canopy *d* of the coal fire grate and the front surface of the baffle *e* forms a front passage *k* by which air from the room can pass beneath the canopy to the chimney *j* without interfering with the burning gases within or behind the radiants *h*.

With the baffle *e* may be combined a separate or integral transverse member *f* which extends across and rests on the top of the fire back *g*, and assists in deflecting to the rear of the back *g* chimney debris falling behind the baffle.

A baffle as above described serves as a superstructure for the fire and gives the appearance of the inserted fire occupying the whole of the portion of the coal grate cavity which is visible from the room. Also any undesirable effect due to chimney pull causing excessive air flow over the radiants such as might impair the radiant efficiency of the fire can be minimized. Moreover the baffle deflects chimney debris away from the radiants, this being especially advantageous with radiants of the open-top kind.

It has already been proposed in Patent Specification No. 18995 of 1913 to provide the upper portion of a gas fire with a pair of outlet apertures which are separated by a baffle-like part, and which are adapted to conduct combustion products and air respectively to the chmney of the fire, and no claim is made to anything described in that Specification.

Blackpool is to have its first contingent of gas-driven buses on account of the petrol shortage. The Corporation Transport Committee came to this decision on Oct. 17. A Ministry of Transport Officer has visited the town, and when sanction is forthcoming additional buses will be converted immediately. The gas cylinders are completely enclosed and filling stations, supplied by the Gas Department, are to be installed. The buses will be used during the peak periods. Single-deck petrol buses only will be converted.

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Gas Products Prices

The London Market

Oct. 27.

Prices of Coal Tar Products in the London market remain at about the following levels:

Pitch nominal; creosote about 5d.; refined tar 3¾d. to 4d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole 1s. 10d.; 95/160 solvent naphtha 2s. 5d. to 2s. 8d., and 90/160 pyridine 13s. 6d.; all per gallon naked; refined crystal naphthalene £23 per ton in bags. All prices are *ex* Makers' Works.

The Provinces

Oct. 27.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4¼d. to 4¾d.; low gravity, 4¼d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6¼d.; filtered heavy oil (min. gr. 1,080), 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10.

A Bonus of 2% on wages earned by members of the Gloucester Gas Light Company's Profit Sharing and Saving Scheme was announced at the annual meeting held recently.

Tar Products in Scotland

GLASGOW, Oct. 25.

Prices continue strong, but new business is rather curtailed owing to the many restrictions now operating.

Refined tar is steady at 4¾d. to 5d. per gallon for delivery in the home market, while for export price is now about 4d. per gallon, both f.o.r. naked.

Creosote oil is well looked after locally with prices not lower than the following: Specification oil, 5¾d. to 6d. per gallon; low gravity, 6¼d. to 7d. per gallon; neutral oil, 6d. to 6½d. per gallon; all *ex* Works in bulk.

Cresylic acid: The market has not yet settled down to the new method of working, and prices are therefore nominal as under: Pale, 99/100%, 4s. 4d. to 4s. 8d. per gallon; Pale, 97/99%, 4s. to 4s. 3d. per gallon; Dark, 97/99%, 3s. 9d. to 4s. per gallon; all *ex* Works in buyers' packages.

Crude naphtha shows no alteration at about 6¼d. to 7½d. per gallon *ex* Works in bulk, according to quality.

Solvent naphtha: 90/160 grade is 1s. 8¼d. to 1s. 9d. per gallon and 90/190 Heavy Naphtha is 1s. 4¼d. to 1s. 5¼d. per gallon.

Pyridines remain difficult with value at about 14s. per gallon for 90/160 grade and 16s. per gallon for 90/140 grade.

The Directors of Associated Gas and Water Undertakings, Ltd., announce that they have declared an interim dividend of 2½% actual, less tax, on the Ordinary Shares, on account of the year ending March 31, 1942, payable on Nov. 29, 1941 (same).

Gas Stocks and Shares

The week opened with a more cheerful sentiment on the news that Russia was holding the German drive on Moscow. Interest was resumed in gilt-edged stocks and leading industrials, though the volume of business was on the small side. As the week progressed and the news fluctuated prices responded accordingly, though the general undertone closed firm. At one time 3½% War Loan reached 106½, and several other British Funds made fractional increases. There were more enquiries for industrials although not much expansion in business, and prices closed below the best. With few exceptions oil shares were firmer but rubbers remained quiet.

There were no outstanding features in the Gas Market. The volume of business was on a smaller scale than the previous week and not so widespread, recorded transactions being confined mainly to a few of the larger undertakings. Prices were maintained, however, and the few changes shown below were negligible.

It is interesting to note that the Bombay Gas Company Limited is maintaining its interim dividend of 3½%. This Undertaking has shown satisfactory increases in gas sales for many years past, and it is in a strong financial position. An annual distribution of 8% has been paid since 1930, and at this rate the yield on the current market price of 22s. 4½d. works out at £7 3s. 0d.%. The shares, however, are not usually readily obtainable.

The following price changes occurred during the week:

OFFICIAL LIST		
Brighton & Hove Cons. (*x.d.*) ...	60—65	Oct. 20
Imperial Continental	57—62	−4
South Metropolitan 4 p.c. Pref. ...	60—65	+3
PROVINCIAL EXCHANGES		
Bristol 5 p.c. max.	93—95	+1
Liverpool Ord....	95—97	+1
Newcastle Units	18/—18/6	—/3d.
,, 4 p.c. Pref.	82—83	−½

Metro
TRADE MARK.

IN normal circumstances this space is occupied by information concerning the many Coal Tar and Ammonia Chemicals produced by the South Metropolitan Gas Company.

MANY of these products, required in the last war, are wanted more than erer to-day for war purposes.

CERTAIN "Metro" products, however, are available for normal business, such as Medium Soft Coal Tar Pitch, Creosote Oils, Dry Neutral Sulphate of Ammonia, etc., and enquiries for these should be directed to the manufacturers:—

SOUTH METROPOLITAN GAS COMPANY

Products Department:
REGIS HOUSE,
KING WILLIAM STREET,
E.C.4.

Telephone: AVENUE 2755.

DEC 4 1941

En passant

What a piece of work is man !
How noble in reason ! how infinite in faculties !
In form and moving, how express and admirable !
In action, how like an angel !
In apprehension, how like a god !

Shakespeare (Hamlet).

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Number Thirty-one.

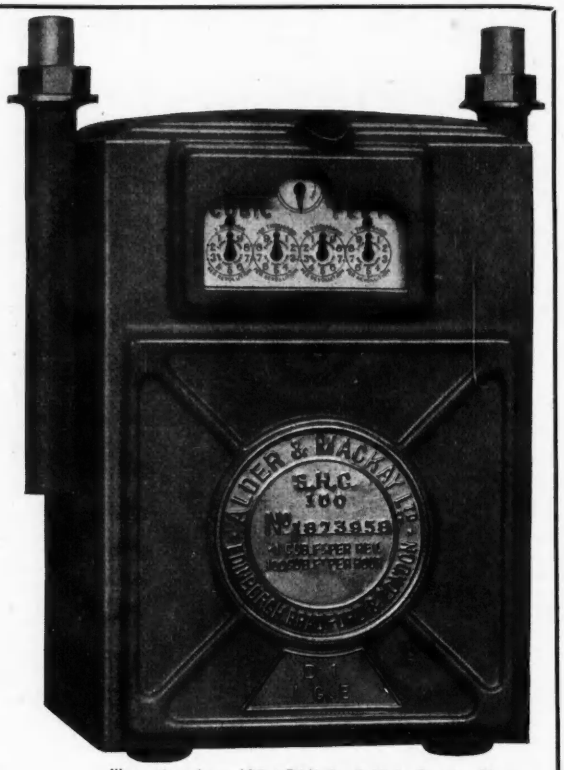

Illustration shows IGE "D1" Small High Capacity Meter. These meters are confidently recommended for demands up to the badge capacity.

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